Infrastructure Security against impact and intrusion

Academic Year: (2022 / 2023) **Review date: 20-06-2022**

Department assigned to the subject: Continuum Mechanics and Structural Analysis Department

Coordinating teacher: LOYA LORENZO, JOSE ANTONIO

Type: Compulsory ECTS Credits : 6.0

Year : 4 Semester : 2

REQUIREMENTS (SUBJECTS THAT ARE ASSUMED TO BE KNOWN)

Strength of Materials,
Lightweight protection systems,
Explosive Dynamics.

OBJECTIVES

- Designing protection systems and mobile systems infrastructure under localized impact and explosive charge.
- Plan and perform validation tests protection systems.
- Develop systems to ensure the safety of infrastructure against intrusion.
- Plan infrastructure security installations, existing or new construction.
- Identify potential threats and vulnerabilities of infrastructure.
- Define security plans to harness the technologies implemented in the infrastructure.
- Design oriented systems integration infrastructure for physical protection, combining technologies architectural design and structural protection with electronic and communication technologies.
- Know the basic laws governing fluid motion and know how to apply the analysis of simple problems.

- Know the basic principles of simulation of solid mechanics problems using numerical techniques, and be able to adequately model these problems.
- Know the basic concepts related to structural dynamics.
- Know the early response to localized impact and explosion of structural elements of concrete and steel used in the construction of infrastructure.
- Understand and apply the most widely used for the analysis of structural elements subjected to localized impact and simplified models explosive charges.
- Know the structural elements used in infrastructure protection against intrusion: walls, perimeter fences or barriers exclusion areas.

DESCRIPTION OF CONTENTS: PROGRAMME

This course develops the principles for the analysis of infrastructures subjected to impulsive loads (localized impact, explosion), as well as the basics knowledge for modeling and design protection systems with specific security requirements. The basic concepts of dynamics of structural elements are initially introduced. These allow for the subsequent development of infrastructure protection and reinforcement techniques against localized impact load or overpressure.
All this knowledge allows to analyze and design systems that guarantee the security of infrastructures against different types of threats: bomb vehicles, ballistic attacks, hand-launched projectiles, bomb packages. Likewise, strategies for the safe design of infrastructures against intrusion are proposed, through protection structures: walls, perimeter fences, exclusion areas or barriers.

LEARNING ACTIVITIES AND METHODOLOGY

50% of the formative activities are oriented to the acquisition of theoretical knowledge. The remaining activities (50%) are oriented to the acquisition of practical capabilities in relation to the subject program.
Master lectures, sessions of problems resolution, student presentations, individual sessions, and personal student work for theoretical knowledge (3 ECTS).
Practical sessions of laboratory and sessions of problems in reduced groups, individual sessions, and personal student work for practical knowledge (3 ECTS).

ASSESSMENT SYSTEM

Final exam (obligatory): 40%

Continuum evaluation: 60%
- Laboratory reports: 15%
- Evaluation test : 30%
- Evaluation test controls: 15%

% end-of-term-examination:	40
% of continuous assessment (assigments, laboratory, practicals…):	60

BASIC BIBLIOGRAPHY

- B. A. Nadel Building security: handbook for architectural planning and design, McGraw-Hill Education, 2004
- J.A. Demkin Security planning and design: a guide for architects and building design, Wiley, 2003
- J.G. Hetherington, P.D. Smith Blast and ballistic loading of structures, CRC Press, 1994

ADDITIONAL BIBLIOGRAPHY

- C. Riggs Network perimeter security: building defense in-depth, CRC Press, 2003
- Disponible Online Physical security : FM 3-19.30, Headquerters, Department of the Army, 2001
- Disponible Online Physical security : UFC 3-340-02, Headquarters, Department of the Army, 2001
- Disponible Online STRUCTURES TO RESIST THE EFFECTS OF ACCIDENTAL EXPLOSIONS: UFC 3-340-02, U.S. ARMY CORPS OF ENGINEERS, 2008